

correlation was observed between the expressions of these two molecules ($R^2 = 0.657$, $p=0.00121$). 35

DETAILED DESCRIPTION OF THE INVENTION

[0037] The invention consists on a vaccine composition able to cause an immunocastration of self-TGF α that can be used for the treatment of certain cancers and other diseases related with TGF α .

[0038] On the other hand this invention include the use of a vaccine preparation constituted by a combination of TGF α and EGF. This vaccine can be used for the treatment of neoplasias that depend on these two growth factors in the course of its pathogenesis.

[0039] 1 - Immunogenic preparations:

[0040] In the present invention a vaccine preparation used includes the hTGF α either coupled with a carrier protein for methods of genetic engineering (fusion protein) or for chemical methods of conjugation. The hTGF α used in anyone of these immunogenic preparations can be recombinant, synthetic or obtained from natural source. Different proteins can be used as carriers. As examples of carrier proteins can be used: Toxoide Tetanic, KLH, and P64k protein from *Neisseria meningitidis*, among others. The optimum quantity of hTGF α in the vaccine formulation oscillates between 5 μ g and 1000 μ g per dose.

[0041] On the other hand a vaccine preparation that contains a combination of hTGF α with hEGF (Office of National Registration of Medications, HEBERMIN Not 1266) is used.

[0042] In the specification of TGF α or EGF, any fragment derived from TGF α or EGF that has the same immunology properties and/or similar effects to the original molecule is included. Those derived include, but they are not excluded other, original substitutions of amino acids, change of specific amino acids that increase the stability and/or the activity, chemical modifications, among others.

[0043] A) Obtaining of a fusion protein TGF α -carrier protein by genetic engineering methods:

[0044] The gene coding for hTGF α (500 pb) was amplified by polymerase chain reaction (PCR) using specific primers. The resulting DNA fragment is digested and

cloned in a specific site to an expression vector containing the gene coding for the carrier protein. The resulting protein includes a single or multiple copies of both molecules. You can use an expression vector of mammalian cells, bacteria or yeast. The vector can also include six histidines in the N-terminal end of the carrier protein. The resulting plasmid is verified by restriction analysis on agarose gels, DNA sequencing using Sequenase 2.0 (Amersham- USB), and finally, analysis of expression of fusion protein in any E.Coli expression strain by Western Blot technique, using an antibody specific monoclonal against hTGF α (R&D System). To obtain the protein the bacterial walls are disrupted using a strong rupture method and then the protein is purified for a combination of differential precipitation methods with ammonium sulfate and chromatography methods. Finally, the protein is filtered under sterile conditions and conserved to - 20°C or lyophilized and conserved at 4°C until its later use.

[0045] B) Obtaining of a chemical conjugated containing hTGF α :

[0046] Different preparations that contain hTGF α conjugated with different carrier proteins (as P64k) are obtained. Any chemical conjugation method can be used. As preferential chemical method is used the method using EMCS agent described in the North American patent, U.S.Pat, Not. 4,302,386; Lee et al., 1981.

[0047] Alternatively, you can use the conjugation method with glutaraldehyde. Briefly, these two or three molecules to a concentration of 1 mg/mL in the final solution are mixing with glutaraldehyde to 0.05% (in the total solution). The mixture is incubated for 1 hour at room temperature and then dialyzed against a solution of PBS 1X/10 mM MgCl₂. Finally, a dialysis against PBS 1X is carried out overnight at 4°C. The immunogenic preparation is filtered under sterile conditions and stored at 4°C until its use.

[0048] C) Obtaining of a vaccine that combined hTGF α and hEGF.

[0049] The obtaining of a vaccine that combines the two main ligands of the EGF-R can be performed in different ways:

[0050] 1 - Mixing the two vaccines that contain hTGF α or hEGF for separate linked to a carrier protein in a relationship 1:1 just in the moment of the injection. For this purpose can be used the fusion proteins or those chemistry conjugated of each

with a blocking solution of TBS 1X with 5% of skim milk overnight at 4 °C. After a brief wash with TBS 1X- Tween 20 (0.05%), membranes were incubated, one replies with an antibody anti-P64K (1 / 500) (Fig.3A) and the other one with a anti-TGF α Mab (1/100) (Fig.3B) for 2 hours at room temperature. Subsequently were performed 3 washes with the same solution and membranes were incubated with alkaline phosphatase-labeled goat anti-mouse immunoglobulins (1/1000) for 1 hour in same conditions. Finally was added 0.004 g of Fast Net enzyme substrate (Sigma) in buffer containig 0.1 M Tris-Cl pH=8.2, 0.004 g of Naphtol ACE-MX Phosphate (Sigma) and 400 μ L of NN'Dimetil Formamide in 20 mL. The reaction stopped with similar washes. A specific recognition of TGF α -P64k by the antihTGF α Mab was observed (Fig: 3). This result demonstrates that TGF α in the fusion protein maintains a structure able of being recognized by a specific antibody.

[0077] Example 7: Obtaining of a chemical conjugated hTGF α -P64k.

[0078] A milliliter of TGF α in PBS/10mM MgCl₂ at 2 mg/mL is mixed with a milliliter of P64k at 2 mg/mL in the same solvent. Then 0.2 mL of 0.5% glutaraldehyde solution was added for a final percent of 0.05%. The mixture was incubated 1 hour at room temperature, and dialyzed against a PBS 1X/10 mM MgCl₂ solution. Finally, dialysis against PBS 1X was carried out overnight at 4°C. The immunogenic preparation is filtered under sterile conditions and stored at 4°C until its use.

[0079] Example 8: Obtaining of a fusion protein between hTGF α , hEGF and P64k.

[0080] The gene coding for hEGF (150 pb) it is amplified by PCR using the plasmid pBEF 10 as template. That plasmid contains the complete hEGF cloned in the EcoR V site of commercial vector pBluescript SK II (Stragene). The obtained DNA is linked to the pMHisTGF α plasmid in a Bam HI site located in the Cterminal end of the P64k using the methodology described in the example 2. This way the pMTGF α - EGF vector is obtained that codes for the fusion protein TE-P64k.

[0081] Example 9: Obtaining of a chemical conjugated hTGF α -hEGF-P64k.

[0082] A milliliter of TGF α in PBS/10 mM MgCl₂ at 3 mg/mL is mixed with a milliliter of hEGF at 3 mg/mL and P64k at 3 mg/mL in the same solvent. Then 0.6 mL